REMARKS

Herein, the "Action" or "Office Action" refers to the Office Action dated October 9, 2003.

Applicant respectfully requests reconsideration and allowance of all of the claims of the application. Claims 1-35, 37-40, and 42-52 are presently pending. Claim 14 is amended herein. Claims 36 and 41 are withdrawn or cancelled herein. No new claims are added herein.

Formal Objections

Double Patenting

The Office advises that if claims 44 and 45 were found allowable, then claims 36 and 41, respectively, will be objected to under 35 CFR § 1.75 as being a substantial duplicate thereof ("double-patenting"). Claims 36 and 41 have therefore been canceled.

Claim Objection

The Office objects to claim 14 because it does not include definitions of several variables (like the ones defined in claim 6). Applicant amends claim 14 to include definitions of the variables.

Formal Claim Rejections

Claim Rejections under §112

The Office rejects claims 3, 16, 21, 33, 40, and 48 as being indefinite. More specifically, the Office indicates that the recitation in these claims of the term "highly entropic" is renders them indefinite because the term is relative. The Office suggests defining a specific measurement for entropy.

Applicant respectfully submits that the term "highly entropic" is defined in the specification. In particular, page 18, lines 7-8, describe a "highly entropic data" of a packet to mean that "the data in the packets are not compressible."

Given this definition in the specification, Applicant submits that this term is already defined and thus not indefinite. Accordingly, Applicant asks the Office to withdraw these rejections.

Substantive Claim Rejections

Claim Rejections under §103

The Office rejects all pending claims under §103. For the reasons set forth below, the Office has not made out a *prima facie* case of obviousness (i.e., §103). Accordingly, Applicant respectfully requests that the rejections be withdrawn and the case be passed along to issuance.

The Office's rejections are based upon the following reference:

> **Lai**: *Lai and Baker*, "Measuring Bandwidth" (0-7803-5417-6/99) IEEE 1999;

Bharali: *Bharali et al.*, US Patent No. 6,216,163;

Takagi: *Takagi et al.*, US Patent No. 6,272,148;

Lawrence: *Lawrence*, US Patent No. 6,054,943;

- **Kikuchi:** *Kikuchi et al.*, US Patent No. 6,614,763;

- **Nishigami:** *Nishigami et al.*, US Patent No. 5,890,010;

- **TAPI 3.0:** *Microsoft*, White Paper on "TAPI 3.0 Connection and Media Services (1999);

- **Hosoi:** *Hosoi et al.*, US Patent No. 6,120,149;

- **Lanzer:** *Lanzer et al.*, US Patent No. 6,005,621;

- **Ranganathan:** *Ranganathan et al.*, US Patent No. 5,921,961;

- **Chattorai:** *Chattorai et al.*, US Patent No. 6,329,165.

Overview of the Application

The Application describes techniques directed towards the fast dynamic measurement of connection bandwidth, especially where such measurement utilizes a single pair of packets (i.e., a "Packet-Pair") to calculate bandwidth between two entities on a network (such as the Internet). This calculation is based upon the Packet-Pair technique.

On its journey across a network, a packet may be compressed by communication equipment and modems. This compression shrinks the size of the packet; thus, it can distort the bandwidth calculation using such a shrunken packet. To avoid this distortion, the techniques described in the Application employ non-compressible packets. Therefore, a packet cannot be compressed during its journey.

In addition, on its journey across a network, packets may be rerouted, delayed, misrouted, and the like. These momentary delays may result in a momentary incorrect bandwidth calculation. This problem is ameliorated by using a history list at the client that keeps track of recent measurements. The client returns the median of that list to the server. That median is the specified bandwidth.

Cited References

The Office cites **Lai** as its primary reference in all of its obviousness rejections. The Office cites either **Bharali** or **Chattoraj** as its secondary reference in its obviousness rejections.

Lai

Lai describes a few of the conventional bandwidth measurement techniques. Amongst those described is the Packet-Pair technique. See section IV-B "Packet-Pair" on pp. 238-239 of **Lai**.

Lai explains many of the problems with these conventional techniques. With Packet-Pair, for example, **Lai** explains (at p. 236, lines 8-12 of last full ¶ of col. 2) that Packet-Pair technique is not a robust and practical approach used on a typical public network (such as the Internet).

Lai never discusses or addresses the topic of compression of the packets involved in the Packet-Pair technique. Instead, it focuses on what it calls "time compression" or "time extension" of the two packets of the pair. These terms do not refer to data compression. Rather, they refer to the time delay between

packets. See Fig. 1 and the ¶ that begins at the bottom of col. 2 of p. 238 and ends at col. 1 of p. 239.

Bharali

Bharali describes techniques for providing visualization of performance of a distributed network. Its user interfaces allows easy visualization of the network's performance. Its describes a techniques for determining the distance from a client to a server in the network, for determining a service provider domain, for determining network congestion level, for determining bottleneck throughput, for determining bottleneck location, for determining page retrieval time, and for automatically restarting a page under predetermined conditions.

Within the context of discussing measurements of throughput and congestion level of a network, **Bharali** says the following (col. 8, lines 33-37):

> As one important feature of the invention, in the described method, the packet types are chosen to be non-compressible. Use of compressible packets may lead to unpredictable results and, for this reason, has not been chosen in the described embodiment.

Curiously, **Bharali** fails to elaborate, discuss, or even mention the use of non-compressible packets before or after the above quoted paragraph. **Bharali** says that it is important, but fails to explain why. It says that "use of compressible packets may lead to unpredictable results" but it fails to explain why that might be so.

Furthermore, **Bharali** does not use, mention, teach, describe, or reference the Packet-Pair technique for measuring bandwidth.

Chattoraj

Chattoraj describes techniques for monitoring both the planktonic and sessile microbial populations in an industrial water system by the addition of a fluorogenic dye compound. Measurements are taken regularly at a finite user defined measurement interval. These readings are stored in an historical data structure (FIFO list).

Chattoraj is entirely concerned with monitoring the growth of microorganisms and using that information to control the amount of biocide used to combat that growth.

Chattoraj never uses, mentions, teaches, describes, or references communications networks, measurement of non-biological and non-chemical components, or bandwidth measurement of such (especially "Packet-Pair").

Obviousness Rejections

Lack of *Prima Facie* Case of Obviousness (MPEP § 2142)

Applicant disagrees with the Office's obviousness rejections. Arguments presented herein point to various aspects of the record to demonstrate that all of the criteria set forth for making a *prima facie* case have not been met.

Based upon Lai and Bharali

The Office rejects claims 1, 6, 11-14, 19, 24, 28-31, 36, 43, 44, 46, 51, and 52 under USC § 103(a) as being unpatentable over **Lai** and **Bharali**. Applicant respectfully traverses the rejections of these claims. Based on the reasons given below, Applicant asks the Office to withdraw its rejection of these claims.

No Motivation to Combine References

Applicant asserts that there is no motivation to combine the teachings of **Lai** and the teachings of **Bharali.**

Lai describes conventional bandwidth measurement techniques, including the Packet-Pair technique. **Lai** explains (at p. 236, lines 8-12 of last full ¶ of col. 2) that the Packet-Pair technique is not a robust and practical approach used on a typical public network (such as the Internet). In its rejections, the Office relies on the **Lai's** discussion of the Packet-Pair technique as showing the use of a first and/or a second packet for measuring bandwidth.

Bharali describes techniques for providing visualization of performance of a typical distributed network, such as the Internet. See "Field of the Invention" section, col. 1, lines 37-41. At col. 8, lines 33-37, **Bharali** does indicate it chooses non-compressible packet-types because the use of "compressible packets may lead to unpredictable results."

Bharali fails to elaborate, discuss, or even mention the use of non-compressible packets before or after col. 8, lines 33-37. **Bharali** says that it is important, but fails to explain why. It says that "use of compressible packets may lead to unpredictable results" but it fails to explain why that might be so or to what such unpredictability might relate. Specifically, there is absolutely no suggestion that compressible packets might affect bandwidth measurements such as the Packet-Pair technique.

In other words, **Lai** states that the Packet-Pair technique is impractical over a public network. **Bharali** fails to provide any suggestion that Packet-Pair technique could be improved by using non-compressible packets. This is in part because **Bharali** does not even mention the Packet-Pair technique, and also

because **Bharali** does not elaborate on any particular advantage of using non-compressible packets. Thus, there is nothing in **Bharali** that would suggest the use of non-compressible packets in conjunction with the Packet-Pair technique.

Accordingly, Applicant submits that one of ordinary skill would not be motivated to combine the Packet-Pair technique of **Lai** with the "non-compressible" packets of **Bharali**, where **Bharali** fails to disclose the use of the Packet-Pair technique (of **Lai**) or any factual reasons why "non-compressible" packets are desirable.

Claims 1, 13, 19, 30, 43, 44, 46, 51 and 52

The Office does not tie specific language of these claims to any specific cited portion of the reference. Instead, without linkage to any particular claim language, the Office discusses the cited references and cites portions of the references to support its discussion and conclusion. The portions cited by the Office include the following:

- **Lai**, section IV, B, pages 238-239;
- **Lai**, Fig. 1;
- **Bharali**, col. 8, lines 12-13 and 15-17.

Claim 1 recites:
  receiving at least one first non-compressible packet having measurable characteristics;
  calculating bandwidth based upon, at least partially, characteristics of the first non-compressible packet.

Claims 13 and 43 recite:

>receiving a first non-compressible packet;

>receiving a second non-compressible packet;

>calculating bandwidth based upon the first and second non-compressible packets.

Claim 19 recites:

>sending at least one first non-compressible packet;

>receiving a bandwidth calculation based upon, at least partially, measurements related to the first non-compressible packet.

Claims 30 and 44 recite:

>sending a first non-compressible packet;

>sending a second non-compressible packet immediately after the sending of the first packet.

Claim 46 recites:

>a first packet containing non-compressible data;

>a second packet following the first packet, the second packet containing non-compressible data.

Claim 51 recites:

>a processor;

>a bandwidth measurer executable on the processor to:

>>receive a first non-compressible packet having measurable characteristics;

>>receive a second non-compressible packet having measurable characteristics;

calculate bandwidth based upon characteristics of the first and second non-compressible packets.

Claim 52 recites:
a processor;
a bandwidth measurer executable on the processor to:
sending a first non-compressible packet;
sending a second non-compressible packet immediately following the sending of the first packet.

In the Action, the Office acknowledges (p. 4, lines 7-8) that "Lai does not disclose the packets being non-compressible." The Office indicates (p. 4, lines 8-9) that "Bharali teaches a network system that utilizes non-compressible packets when sending messages." Based on this, the Office concludes that it would have been obvious to "include non-compressible packets as taught by Bharali in the invention disclosed by Lai because use of compressible may lead to unpredictable results as taught by Bharali."

The Office does not explain how or why one of ordinary skill would be motivated to combine the relevant teachings of **Lai** and **Bharali**. More specifically, the Office does not cite any specific objective evidence in the cited references that would motivate one of ordinary skill to combine the relevant teachings of the references to produce the recited features and elements of these claims.

While a technical dictionary may disclose every particular structural feature recited in a claim, Applicant submits that a proper obviousness rejection must still show sufficient objective evidence as to a teaching, suggestion, or motivation to

combine such structural features – not solely as individual elements – but as recited in the claims.

Applicant respectfully submits that the Office has not presented objective and specific evidence sufficient to support a motivation to combine the relevant teachings of **Lai** and **Bharali.**

Accordingly, Applicant asks that the Office withdraw its rejection of these claims.

Claims 2-12

These claims ultimately depend upon independent claim 1. As discussed above, claim 1 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claims 14-18

These claims ultimately depend upon independent claim 13. As discussed above, claim 13 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claims 20--29

These claims ultimately depend upon independent claim 19. As discussed above, claim 19 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claims 31-36

These claims ultimately depend upon independent claim 30. As discussed above, claim 30 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claims 47-50

These claims ultimately depend upon independent claim 46. As discussed above, claim 46 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Based upon Lai and Chattoraj

The Office rejects claims 37, 38, 41, 42, and 45 under USC § 103(a) as being unpatentable over **Lai** and **Chattoraj**. Applicant respectfully traverses the rejections of these claims. Based on the reasons given below, Applicant asks the Office to withdraw its rejection of these claims.

No Motivation to Combine References

Applicant asserts that there is no motivation to combine the teachings of **Lai** and the teachings of **Chattoraj**.

Lai describes conventional bandwidth measurement techniques, including the Packet-Pair technique. **Lai** explains (at p. 236, lines 8-12 of last full ¶ of col. 2) that the Packet-Pair technique is not a robust and practical approach used on a typical public network (such as the Internet).

Chattoraj describes techniques for monitoring both the planktonic and sessile microbial populations in an industrial water system by the addition of a fluorogenic dye compound. Measurements are taken regularly at a finite user-defined measurement interval. These readings are stored in an historical data structure (FIFO list).

Chattoraj is entirely concerned with monitoring the growth of microorganisms and using that information to control the amount of biocide used to combat that growth.

Chattoraj never uses, mentions, teaches, describes, or references communications networks, measurement of non-biological and non-chemical

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components, or bandwidth measurement (especially using "Packet-Pair") of communications networks.

Applicant submits that **Chattoraj** does not address the types of problems confronting those of communications networks, measurement of non-biological and non-chemical components, or bandwidth measurement (especially using "Packet-Pair") of communications networks.

Applicant submits that one of ordinary skill would not be motivated to combine the distinctly non-biological communication network bandwidth measurement techniques of **Lai** with the distinctly biological techniques of **Chattoraj** that measuring populations of microorganisms in an industrial water system.
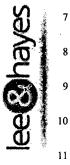
Claims 37, 42 and 45

The Office does not tie specific language of these claims to any specific cited portion of the reference. Instead, without linkage to any particular claim language, the Office discusses the cited references and cites portions of the references to support its discussion and conclusion. The portions cited by the Office include the following:

- **Lai**, section IV, B, pages 238-239;
- **Chattoraj**, col. 15, lines 21-30.

Claims 37 and 45 recite:
    generating a list of entries, each entry containing a recent bandwidth measurement;

each measurement being based upon a Packet-Pair bandwidth calculation of different pairs of packets.

Claim 42 recites:

a list of entries, each entry being a recent bandwidth measurements;

each entry being based upon a Packet-Pair bandwidth calculation of different pairs of packets.

In the Action, the Office acknowledges (p. 10, lines 13-15) that "Lai does not explicitly teach storing recent measurements into a list used for estimating the actual bandwidth." The Office indicates (p. 10, lines 15-16) that "Chattoraj teaches storing measurements into a historical data structure (list) and determining trends based on that list." Based on this, the Office concludes that it would have been obvious to "include a list of measurements for determining trends as taught by Chattoraj in the Lai invention because determining trends (estimating bandwidth) of multiple measurements would provide a more accurate measurement of the actual bandwidth than one measurement."

The Office does not explain how or why one of ordinary skill would be motivated to combine the relevant teachings of an IEEE paper (**Lai**) focused on describing various ways of measuring bandwidth in a communications network (such as the Internet) and a patent (**Chattoraj**) on measuring and controlling the growth of microorganisms in industrial water systems.

More specifically, the Office does not cite any specific objective evidence in the cited references that would motivate one of ordinary skill to combine the

relevant teachings of the references to produce the recited features and elements of these claims.

While a technical dictionary may disclose every particular structural feature recited in a claim, Applicant submits that a proper obviousness rejection must still show sufficient objective evidence as to a teaching, suggestion, or motivation to combine such structural features – not solely as individual elements – but as recited in the claims.

Applicant respectfully submits that the Office has not presented objective and specific evidence sufficient to support a motivation to combine the relevant teachings of **Lai** and **Chattoraj.**

Accordingly, Applicant asks that the Office withdraw its rejection of these claims.

Claims 38-41

These claims ultimately depend upon independent claim 37. As discussed above, claim 37 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Dependent Claims

In addition to its own merits, each dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each dependent claim where its base claim is allowable.

Conclusion

All pending claims are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the application. If any issues remain that prevent issuance of this application, the Office is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

Dated: 3-2-04

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